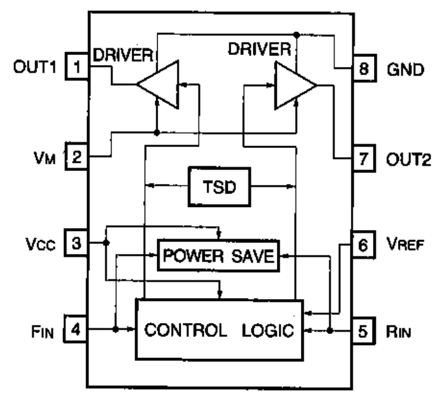
Reversible motor driver
BA6287F

The BA6287F is a reversible-motor driver with a maximum output current of 1.0A. Two logic inputs allow four output modes : forward, reverse, stop (idling), and brake. A built-in power saving circuit suppresses current consumption when the motor is in stop mode.

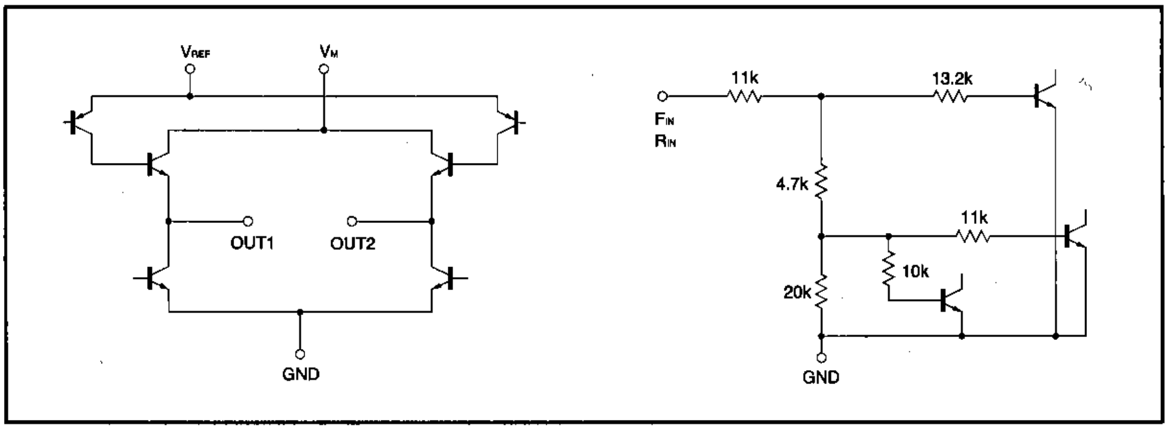
●Applications
VCRs and audio equipment in general

●Features
1) Built-in surge-absorbing diodes.
2) Built-in power saving circuit suppresses the stop mode current consumption.
3) Output voltage can be set arbitrarily with the V_{REF} pin.
4) Interfaces with TTL devices.
5) Built-in thermal shutdown circuit.

●Block diagram



● Input / output circuits



● Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	18	V
Power dissipation	Pd	650*1	mW
Operating temperature	Topr	−20~75	℃
Storage temperature	Tstg	−55~150	℃
Output current	$I_{OMax.}$	1000*2	mA

* Mounted on a glass epoxy PCB (50 X 50 X 1.6 mm).
*1 Reduce power by 5.2 mW for each degree above 25℃.
*2 Should not exceed Pd- or ASO-value

● Recommended operating conditions (Ta=25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V_{CC}	4.5	−	15	V
Motor supply voltage	V_M	4.5	−	15	V
HIGH level output voltage setting pin	V_{REF}	4.5	−	15	V

● Electrical characteristics (Unless otherwise noted, Ta=25℃, V_{CC}=9V, V_M=9V, V_{REF}=9V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Circuit current 1	I_{CC1}	12	24	36	mA	Forward or reverse mode
Circuit current 2	I_{CC2}	29	48	67	mA	Brake mode
Standby circuit current	I_{ST}	−	−	15	μA	Standby mode
V_{REF} pin sink current	I_{REF}	6	12	18	mA	Forward or reverse mode I_O=200mA
HIGH level input voltage	V_{IH}	2.0	−	−	V	
LOW level input voltage	V_{IL}	−	−	0.8	V	
HIGH level input current	I_{IH}	45	90	135	μA	V_{IN}=2.0V
Output saturation voltage	V_{CE}	−	1.0	1.5	V	I_O=200mA Sum of output transistor high- and low-side voltages

● Electrical characteristic curves

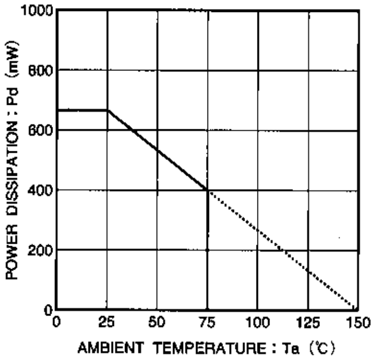


Fig.1 Heat reduction curve

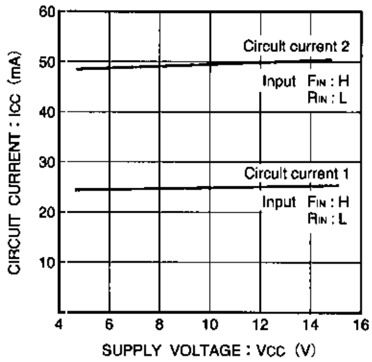


Fig.2 Circuit current vs. supply voltage

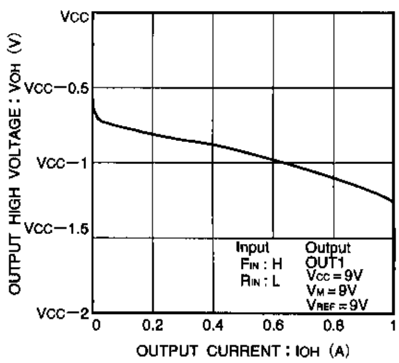


Fig.3 HIGH level output voltage vs. output current

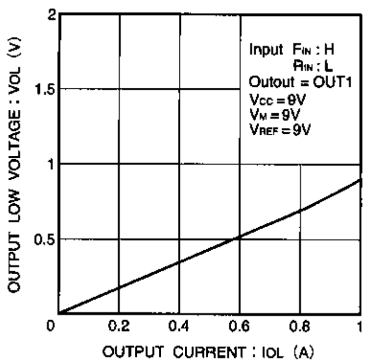


Fig.4 LOW level output voltage vs. output current

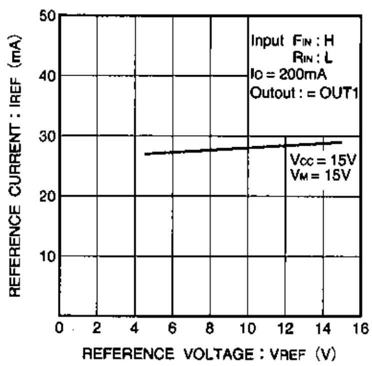


Fig.5 VREF reference current vs. VREF reference voltage

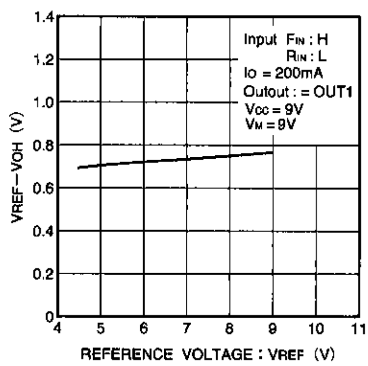


Fig.6 VREF-VOH voltage vs. VREF reference voltage

●Circuit operation

(1) Input section

The four output modes are controlled by two logic inputs. Current flows from OUT1 to OUT2 when F_{IN} is HIGH and R_{IN} is LOW, and from OUT2 to OUT1 when R_{IN} is HIGH and F_{IN} is LOW (refer to the truth table). The input circuit can be operated by a logic circuit with a current capacity of 120 ~ 170 μA.

Input/output truth table

F_{IN}	R_{IN}	OUT1	OUT2	Mode
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Brake
L	L	OPEN	OPEN	Standby

(2) Output section

Current flows from OUT1 to OUT2 during forward rotation, and from OUT2 to OUT1 during reverse rotation. The output voltages V_{OH} and V_{OL} are given by :

V_{OH} [V] = V_{REF} − $V_{CE\ (sat)}$ (PNP) − V_{BE} (NPN)

V_{OL} [V] = $V_{CE\ (sat)}$ (NPN)

V_{CE} and V_{BE} are functions of the output current (see electrical characteristic curves). The output current can be set with the V_{REF} pin.

(3) Power saving circuit

All circuits are turned OFF when the F_{IN} and R_{IN} input pins are both put to LOW level. This circuit saves power during standby mode by leaving the outputs OPEN.

(4) Thermal shutdown circuit

When the thermal shutdown circuit is activated at the chip temperature of about 175℃ (typical), the outputs are left OPEN. The temperature difference between the activation and deactivation settings is about 15℃. When the thermal shutdown circuit is deactivated, the outputs revert to the status determined by input mode.

●Pin description

Pin No.	Pin name	Function
1	OUT1	Motor output pin
2	V_M	Motor power supply
3	V_{CC}	Power supply pin
4	F_{IN}	Logic input pin
5	R_{IN}	Logic input pin
6	V_{REF}	HIGH level output voltage setting pin
7	OUT2	Motor output pin
8	GND	GND

●Operation notes

(1) To improve the reliability of operation, make sure to go through the open mode when reversing the motor rotational direction.

(2) CONTROL LOGIC pins

Voltage should never be applied to the CONTROL LOGIC pins when the V_{CC} voltage is not applied to the IC. Similarly, the voltage of each input pin should not exceed any applied V_{CC} voltage.

(3) HIGH level output voltage setting pin

Ensure that the voltage applied to V_{REF} does not exceed the voltage on the motor power supply pin or the V_{CC} pin.

(4) PCB arrangement

When changing the rotational direction of a motor, a large current of up to a few hundred milliamperes can flow between the motor power supply and GND. Depending on the application, this large output current may flow back to input pins, resulting in output oscillation or other malfunctions. Make sure that your design does not allow a common impedance between the large current output line and the input section. Suppress the power supply impedance to low levels, otherwise oscillation can occur.

(5) Package power

The power dissipated by the IC varies widely with the power supply voltage and the output current. Give full consideration to the package power dissipation rating when setting the power supply voltage and the output current.

(6) ASO

Make sure that the output current and supply voltage will not exceed the ASO values.

(7) Ground pin potential

Keep the potential of the ground pin lower than the potentials of the other pins.

(8) The input pins have temperature-dependent characteristics. Take the temperature effect into consideration when using the IC.

(9) To eliminate motor noise, connect a capacitor between OUT1 and GND and between OUT2 and GND. Alternatively, connect a capacitor between OUT1 and OUT2, and also a diode between OUT1 and GND and between OUT2 and GND (see Fig. 7).

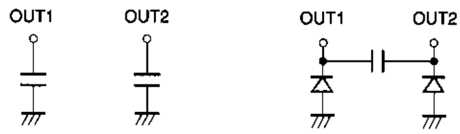
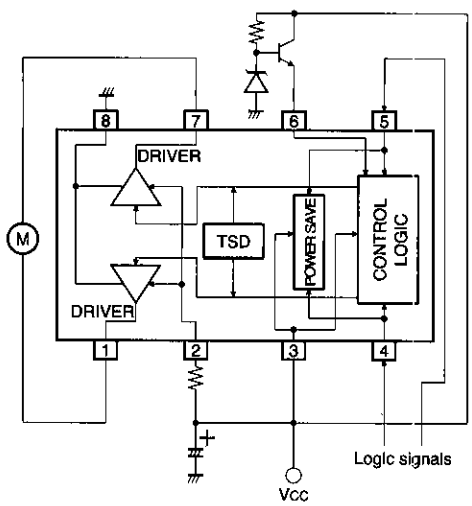


Fig.7

●Application example



●External dimensions (Units: mm)

